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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/648,276	08/27/2003	Shinya Watanabe	Q76956	4435

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EXAMINER

DOLAN, JENNIFER M

ART UNIT	PAPER NUMBER
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2813

DATE MAILED: 07/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/648,276

Applicant(s)

WATANABE ET AL.

Examiner

Jennifer M. Dolan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 28-36 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 28-36 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. 10/067,320.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 28, 29, 32, and 33 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,926,586 to Dragone et al.

Regarding claim 28, Dragone discloses a chip manufacturing method, comprising: forming a plurality of elements on a wafer (figure 5), each element bounded by its respective contours (curved boundaries in central/dotted-line region of figure 5), each element having at least one edge with a concave shape recessed in one direction (figure 5; each element has one concave and one convex shape); and cutting out the plurality of elements from the wafer to obtain chips each comprising an individual element (column 2, lines 50-57; column 4, lines 1-16).

Regarding claim 29, Dragone discloses that the chips are cut using a laser beam (column 4, lines 18-25).

Regarding claim 32, Dragone discloses that dicing is used to cut the straight-line portions of the contours (column 4, lines 18-25; only the curved portions are cut with the laser; also see column 2, lines 5-26).

Regarding claim 33, Dragone discloses that a plate is mounted on at least a portion of the chip (column 5, lines 10-15).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 30 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dragone et al. in view of U.S. Patent No. 5,776,796 to Distefano et al.

Dragone fails to teach that ultrasonic vibration or hydraulic pressure can be used to cut the chips from the wafer.

Distefano teaches that laser cutting, ultrasonic vibration, and hydraulic pressure cutting are all well-known and interchangeable means for dicing a chip component (see column 5, lines 19-25).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to specify that the method of Dragone uses ultrasonic vibration or hydraulic pressure for cutting the chips from the wafer, as suggested by Distefano. The rationale is as follows: A person having ordinary skill in the art would have been motivated to use ultrasonic vibration or hydraulic pressure cutting, because Dragone shows that even non-ideal dicing means, such as lasers, are appropriate to use with the methods taught by Dragone (see Dragone, column 4, lines 5-35). Since Distefano teaches that all of a laser, ultrasonic vibrator, or hydraulic jet are well-known and recognized equivalent means for dicing a semiconductor wafer, a person skilled in

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the art could apply any of these to the methods taught by Distefano with a reasonable expectation of success.

5. Claims 34 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dragone in view of U.S. Patent No. 5,745,631 to Reinker.

Dragone discloses cutting out a first chip of an optical multiplexer (see column 1, lines 5-10), having at least one edge with a concave shape recessed in one direction (figure 5; uppermost chip; each element has one concave and one convex shape; column 2, lines 50-57; column 4, lines 1- 35); and cutting out a second chip having a contour that is substantially similar to the contour of the first chip (figure 5; the second-highest chip).

Dragone does not teach bonding the chips together using an adhesive

Reinker discloses an optical multiplexer formed by stacking chips and flowing an adhesive (column 1, lines 25-45; column 2, lines 1-30; figures 9-11).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Dragone, such that the chips are stacked, as suggested by Reinker. The rationale is as follows: A person having ordinary skill in the art would have been motivated to stack the chips, because doing so allows for the formation of larger scale OEICs, such that a greater number of wavelengths can be accommodated by a multiplexer (see Reinker, column 1, lines 5-30; column 2, lines 25-30; column 5, lines 45-65).

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6. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dragone et al. in view of Reinker as applied to claim 34 above, and further in view of U.S. Patent No. 6,379,909 to Forbes et al.

Dragone fails to suggest that the first chip is cut from a first wafer, and the second chip is cut from a second wafer.

Forbes teaches a stacked chip structure in which the chips can alternately be cut from the same wafer or from different wafers (column 1, lines 20-25).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Dragone as modified by Reinker, such that the chips are cut from different substrates, as suggested by Forbes. The rationale is as follows: A person having ordinary skill in the art would have been motivated to cut the chips from different substrates, because bonding chips cut from different substrates is well-known in the art, and provides the advantages of allowing each device to be fabricated according to its individual performance needs or fabrication processes, as is appreciated by one skilled in the art (see Forbes, column 1, lines 25-60). Since the invention of Dragone as modified by Reinker includes lasers operating at different wavelengths, and accompanying waveguides appropriate to such wavelengths (see Reinker, column 1, lines 5-30, column 2, lines 25-30, column 5, lines 45-65), it would be expected by a person having ordinary skill in the art that the waveguides and lasers from each layer of the array should be formed on different substrates, such that the individual emission properties can be optimized.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 6,528,864 to Arai, U.S. Patent No. 6,521,513 to Lebens et al., U.S. Patent Publication No. 2002/0066940 to Ruben, and JP 9-323300 to Ichihara disclose dicing a substrate in irregular or curved dicing lines.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer M. Dolan whose telephone number is (571) 272-1690. The examiner can normally be reached on Monday-Friday 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl W. Whitehead, Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jennifer M. Dolan
Examiner
Art Unit 2813

jmd


CARL WHITEHEAD, JR.
SUPERVISORY PATENT EXAMINER
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